NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

WELLHEAD PROTECTION, (NUMBER)
(AGRICULTURAL DRAINAGE WELL CISTERNS)

Interim Code IA-981

DEFINITION

Protection of an agricultural drainage well to prevent surface water from entering the well.

PURPOSE

To improve water quality by preventing surface water from entering into an agricultural drainage well.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to any agricultural drainage well in which surface water could enter into the well and cause pollution or contamination of the groundwater. This standard applies to the well casing or cistern to a depth, which generally will not exceed six feet below the ground surface.

CRITERIA

Raising the cistern: The cistern of all agricultural drainage wells shall be a minimum of two feet above the ground surface. The cistern shall be raised to the elevation of the maximum water level that could reasonably be expected. In depressional areas, this is equal to one of the following:

1. The runoff from the contributing drainage area shall be stored below the top of the cistern. The volume will be equal to the runoff from a 50 year - 24-hour rainfall. A runoff value of 3.0 inches may be used in lieu of site-specific calculations.
2. In any situation, the cistern does not need to extend more than one foot above the low point in a saddle if the topography would allow water to drain into a different drainage pattern.

If an agricultural drainage well is in a drainage path (i.e. not in a depression), the cistern shall be raised to the higher of the following:

a. minimum of two feet above the ground surface, or

b. to the elevation of the flow from a 50 year – 24 hour rainfall.

The material used to raise the cistern may be metal pipe, concrete pipe, or reinforced concrete. It is generally recommended that material used be the same as the original cistern; however, different material may be used as long as other requirements are met. In all cases, the joint between the old cistern and the extension shall be watertight.

Repairing Damaged Well Cisterns. Well cisterns, which have corroded, broken, deteriorated, or are damaged in the first six feet below the ground surface shall be repaired or replaced. Some options for accomplishing this requirement are as follows:

1. Remove the old cistern to a depth below the damaged area. Replace this section with new material. The joint between the new and old material shall be watertight.
2. Damaged cisterns may be repaired by lining the old cistern if the structural integrity of the cistern will permit.

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Liners shall form a watertight bond with the original cistern.

3. In some situations it may be possible to line an existing cistern by placing a new cistern inside the original cistern. For example, a damaged 36-inch diameter cistern could be repaired by placing a 24-inch diameter pipe inside the 36-inch cistern. If this option is used, the space between the old and new cisterns shall be filled with concrete.

Berms and Backfill. All wells shall be protected with a berm around the cistern. Material in the berm and backfill around the cistern shall be of material, which includes a high clay content. The material shall be placed in six-inch lifts prior to compaction. The density of the backfill shall be greater than the natural ground around the well. The top of the berm shall extend ten feet from the edge of the cistern on all sides of the well. The top of the berm will be one foot below the top of the cistern and will have a 5 percent slope away from the cistern (0.5 foot in ten feet). The sideslope of the fill for the berm shall not be steeper than 3 horizontal to 1 vertical. The berm shall be seeded in accordance with practice standard 342, Critical Area Planting. An additional grassed setback beyond the berm is recommended.

Diversions. Diversions shall be used to direct surface flow around the well if the topography allows.

Safety. All well cisterns shall have a cover, which can be locked. The cover is to prevent access by unauthorized personnel, rodents, etc. The covers of all cisterns shall be vented to allow gases to escape as well as to prevent a vacuum from occurring.

CONSIDERATIONS

The protection of agricultural drainage wells from surface water contamination should include the application of conservation practices, which protect the water resource throughout the entire watershed. Wellhead protection is used at the well as the final measure to keep surface water from entering the well.

The type of wellhead protection, which is used depends on the physical layout of the system. If the well is in the lowest point in a drainage path, surface diversions should be considered. Berms around the well may also be considered.

In some instances, the cistern of the well could be raised to help accomplish wellhead protection. If the cistern is raised but water can still pond around it, the potential for subsurface infiltration should be considered. Impermeable backfill may be needed around the cistern. Berms or diversions should also be used.

Many old wells have deteriorated so part of the cistern is broken, missing, corroded, etc. In these cases, the cistern will have to be repaired or partially replaced.

PLANS AND SPECIFICATIONS

Plans and specifications for wellhead protection shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

1. The cover of the cistern shall be locked except when it is opened for inspection, maintenance, etc.
2. At least annually, inspect the structural integrity of the lining/cistern.
3. Inspect the vent to insure that it is open and able to function properly.
4. Inspect the berm for erosion, piping, etc. Repair and reseed any damaged areas.